

December 16, 2003

MEMORANDUM TO: L. Raghavan, Chief, Section 1  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

FROM: John G. Lamb, Project Manager, Section 1 **/RA/**  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

SUBJECT: MEETING BETWEEN THE NUCLEAR REGULATORY COMMISSION  
STAFF AND STAKEHOLDERS CONCERNING GENERIC SAFETY  
ISSUE (GSI) 191, "ASSESSMENT OF DEBRIS ACCUMULATION ON  
[PRESSURIZED-WATER REACTOR] PWR SUMP PERFORMANCE"  
(TAC NO. MA6454)

On November 19, 2003, the Nuclear Regulatory Commission (NRC) staff met with the Nuclear Energy Institute (NEI), utility groups, and other stakeholders at NRC Headquarters concerning Generic Safety Issue (GSI) 191, "Assessment of Debris Accumulation on [Pressurized-Water Reactor] PWR Sump Performance." Attachment 1 lists the meeting attendees. A public meeting notice was issued on October 28, 2003, and was posted on the NRC's external (public) web page (ADAMS Accession No. ML032950523). The notice included the meeting agenda.

The purpose of the meeting was to discuss the status of NEI activities regarding the evaluation guidelines and the chemical precipitation and to discuss the status of NRC activities regarding the resolution of GSI-191.

This was a Category 2 Meeting. The public was invited to participate in the meeting by discussing regulatory issues with the NRC at designated points identified on the agenda.

The overall agenda for this meeting consisted of (1) introductions, (2) the status of NEI evaluation guidelines, (3) the status of the chemical precipitation issue, (4) the status of NRC activities, and (5) questions from stakeholders.

Attachment 2, "NEI Methodology Document," was used during NEI's presentation. The NRC staff questioned why the NEI Document, "PWR Containment Sump Evaluation Methodology," dated October 31, 2003 (ADAMS Accession No. ML033090436), was sent to the NRC as a draft versus final document. NEI representatives stated that the document was sent as a draft because the document was concurrently sent to the industry for comments. NEI representatives also stated that they intend to send document revisions to the NRC in a redline/strikeout format so that the NRC staff can see the changes and minimize the impact of the NRC's review. NEI representatives indicated that they expect the industry review to clarify and simplify the guidance and that they did not expect many technical changes.

Attachment 3, "Accumulation and Headloss Calculations," was used during the industry's presentation. A discussion took place regarding the thin-bed effect and the one-eighth inch thickness criteria. A question was raised about other materials since the one-eighth inch thickness criteria was based on fibers. The industry representative stated that there are corrections made to account for the density of the materials.

NEI representatives asked about the status of two documents that NEI sent to the NRC: (1) "Application of Leak-Before-Break [LBB] Technology to Pipe Break Debris Generation and Request for Public Comment Opportunity," dated October 4, 2002 (ADAMS Accession No. ML022880011), and (2) "Break Characteristics Model for Debris Generation Following a Design Basis Loss of Coolant Accident" (better known as the fracture mechanics approach), dated October 10, 2003 (ADAMS Accession No. ML032900916). NEI representatives stated that the LBB and fracture mechanics methodologies are near-term, critical issues needed for the NEI PWR containment sump evaluation methodology and that NEI would like a response to both submittals. The NRC staff stated that it understood that the methodologies in these two submittals are near-term, critical issues and the NRC staff is working on them. The NRC staff indicated that it would develop a target schedule in the next couple of weeks for completing the review of these submittals.

Attachment 4, "Recent NRC Technical Findings," was used during the presentation by the NRC contractor, Los Alamos National Laboratory (LANL), regarding the calcium silicate. The NRC staff mentioned that the LANL Report LA-UR-03-6415, "Small-Scale Experiments: Effects of Chemical Reactions on Debris-Bed Head Loss," has been publicly released (ADAMS Accession No. ML033230260).

Attachment 5, "Summary of Recent/Continuing NRC Research Activities Related to GSI-191," was used during an NRC staff presentation. In relation to chemical effects tests, the NRC staff stated that (1) if precipitated gelatinous debris is formed and transported to the sump screen, it can increase head loss across a fibrous debris bed, and (2) the findings lend credibility to a concern raised by the Advisory Committee on Reactor Safeguards, but the findings are not sufficient to provide a basis for plant-specific quantitative assessment of the chemical effects issue. The NRC staff is considering conducting integrated chemical effects tests in the future.

Attachment 6, "Workshop on Debris Impact on Emergency Coolant Recirculation," was provided as a handout by the NRC staff. This handout will be used during an upcoming international workshop in Albuquerque, New Mexico in February 2004.

Attachment 7, "Zinc and Aluminum Corrosion Product Release During a PWR [Loss-of-Coolant-Accident] LOCA Event," was used during the industry's presentation. Industry representatives presented a draft test plan to perform realistic, conservative, integrated chemical effects tests to determine if gelatinous debris is formed and transported to the sump screen. The industry representatives presented their proposed test matrix, materials, setup, and operation, as well as the candidate facilities to perform the tests. There was a discussion between French regulators who were present at the meeting and the NRC staff regarding the French testing that has been performed. The NRC staff expressed a desire to maintain communications with the French and exchange information regarding this topic. NEI representatives stated that they want the NRC to comment on the draft test plan. The NRC staff stated that it would provide comments on the draft test plan by the middle of December 2003. NEI requested that the NRC staff provide a list of candidate facilities that could perform the integrated chemical effects testing.

The NRC staff stated that it would provide a list of candidate facilities to perform the integrated chemical effects testing by the middle of December 2003, and discussed the possibility of using the University of New Mexico (UNM) facility, as well as the constraints of the UNM facility regarding the proposed integrated chemical effects test plan. The NRC staff also expressed an interest in co-sponsoring with the industry the integrated chemical effects tests and indicated that it will look into the possibility.

Regarding licensees' responses to Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors" (ADAMS Accession No. ML031600259), dated June 9, 2003, the NRC staff stated that it would like to have a public meeting in a few weeks to discuss the responses. The objective of the meeting would be to engage the licensees to ensure that emergency operating procedure actions are timely and that a wide range of interim compensatory measures were considered. The NRC staff also expressed a desire to have the Westinghouse Owners Group present the status of interim compensatory measures to the generic emergency response guidelines.

In closing the meeting, the NRC staff notified the participants of the NRC Public Meeting Feedback form and encouraged them to complete the form and mail it into the NRC. One of the comments received was related to logistics and the need to have a larger conference room for future meetings. The NRC staff noted that the conference room for this meeting was selected based past meeting attendance and the small number of attendees who notified the NRC of their planned participation. The NRC staff will do its best to accommodate all meeting attendees.

- Attachments:
1. Meeting Attendees
  2. "NEI Methodology Document"
  3. "Accumulation and Headloss Calculations"
  4. "Recent NRC Technical Findings"
  5. "Summary of Recent/Continuing NRC Research Activities Related to GSI-191"
  6. "Workshop on Debris Impact on Emergency Coolant Recirculation"
  7. "Zinc and Aluminum Corrosion Product Release During a PWR LOCA Event"

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ADAMS Accession Nos. ML033370003 (Meeting Summary)

ML033520451 (Attachment 2)

ML033520455 (Attachment 3)

ML033520460 (Attachment 4)

ML033520464 (Attachment 5)

ML033520469 (Attachment 6)

ML033520472 (Attachment 7)

ML033530482 (Package)

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LIST OF ATTENDEES  
MEETING REGARDING GENERIC SAFETY ISSUE 191,  
"ASSESSMENT OF DEBRIS ACCUMULATION ON PWR SUMP PERFORMANCE"  
WEDNESDAY, NOVEMBER 19, 2003

<u>NAME</u>	<u>TITLE</u>	<u>ORGANIZATION</u>
J. Lamb	Project Manager	NRC/NRR/DLPM
M. Johnson	Deputy Director	NRC/NRR/DSSA
R. Architzel	Sr. Reactor Eng.	NRC/NRR/DSSA
J. Hannon	Branch Chief	NRC/NRR/DSSA
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P. Patniak	Engineer	NRC/NRR/DE
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G. DeMoss	Engineer	NRC/RES/DRAA
D. Harrison	Engineer	NRC/NRR/DSSA
A. Hsia	Section Chief	NRC/RES/DET
S. Weerakkody	Section Chief	NRC/NRR/DSSA
M. Evans	Branch Chief	NRC/RES/DET
K. Parczewski	Engineer	NRC/NRR/DE
*B. Benney	Project Manager	NRC/NRR/DLPM
*J. Beall	Technical Assistant	NRC/OCM/EXM
B. Letellier	Engineer	Los Alamos National Lab
J. Butler	Sr. Project Manager	Nuclear Energy Institute
T. Pietrangelo	Sr. Director	Nuclear Energy Institute
T. Andreychek	Principal Engineer	Westinghouse
M. Dingler	Engineer	WCNOC/WOG
C. Feist	Engineer	TXU Energy
D. Lincoln	Sr. Engineer	ITS Corp.
G. Zigler	Sr. Engineer	ITS Corp.
C. Hunter	Project Manager	Exelon Corp.
J. Drowley	Project Manager	Exelon Corp.
M. Kostelnik	Engineer	Constellation Energy
G. Hart	Engineer	PCI
J. Hamel	Engineer	General Electric
A. Bilanin	President	Continuum Dynamics, Inc.
H. Williams	Project Manager	Framatome-ANP
L. Sutton	Project Manager	NMC
M. Friedman	Design Engineer-Nuclear	Omaha Pub. Power Dist.
J. Cavallo	Vice President	CCC&L Inc.
Y. Armand	Project Manager	IRSN (France)
J. Enneking	Project Manager	General Electric
G. Dolderer	Project Manager	Florida Power & Light
C. Harrington	Consulting Engr.	TXU Energy
R. Oakley	Sr. Eng.	Duke Energy
G. Kent	Lic. Engineer	Duke Energy
L. Ricker	Engineer	Proto-Power
A. Smith	Proj. Mgr.	Enercon Services
B. Rinkecs	Engineer	Westinghouse
A. Drake	Engineer	Constellation Energy Group
J. Grant	Engineer	PSEG Nuclear
D. Raleigh	Client Mgr.	Lis. Scientech
*J. Gisclom	Project Manager	EPRI

\*Participated via teleconference

NRR = Office of Nuclear Reactor Regulation  
DLPM = Division of Licensing Project Management  
DSSA = Division of Systems Safety and Analysis  
OCM/EXM = Office of Commissioner McGaffigan  
DE = Division of Engineering  
RES = Office of Nuclear Regulatory Research  
DET = Division of Engineering Technology  
DRAA = Division of Risk Analysis and Applications